MonM02

Recent Developments of Ion Sources for Life Science Studies at the Heavy Ion Medical Accelerator in Chiba

Atsushi Kitagawa[1], Arne G. Drentje[1], Takashi Fujita[1], Masayuki Muramatsu[1], Keita Fukushima[2], Naohiro Shiraishi[2], Taku Suzuki[2], Katsuyuki Takahashi[2], Wataru Takasugi[2], Sándor Biri[3], Richárd Rácz[3], Yushi Kato[4], Takashi Uchida[5], and Yoshikazu Yoshida[5]

[1]*Research Center for Charged Particle Therapy, National Institute of Radiological Sciences, Chiba, Japan*
[2]*Accelerator Engineering Corporation,Chiba, Japan,*
[3]*Institute for Nuclear Research (ATOMKI), Debrecen, Hungary*
[4]*Graduate School of Engineering, Osaka University, Osaka, Japan*
[5]*Bio-Nano Electronics Research Centre, Toyo University, Kawagoe, Japan*

Corresponding Author: Atsushi Kitagawa, e-mail address: kitagawa@nirs.go.jp

Ion beam technology is a powerful tool for life science studies. With relativistic high-energy ion beams provided by the Heavy Ion Medical Accelerator in Chiba (HIMAC) many medical researches and various experiments on radiation effectiveness have been realized. Wide variety of ion species from H to Xe ions is required by users. Presently, three electron cyclotron resonance ion sources (ECRISs) and one Penning ion source are available to satisfy such requirements. The summary of recent requirements will be presented.

A similar capability is expected by some life science institutes and hospitals. However, downsizing to reduce construction and operation costs is also desired at such facilities. NIRS has developed a feasible solution with a hospital-specified accelerator complex in conjunction with improved ion sources of which the effectiveness has been tested at HIMAC. The performance of the 18 GHz ECRIS has been improved with various techniques like two frequency heating, biased electrodes, MIVOC, and so on. The results of developments will be summarized.